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10/568,755

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Stefan Boehm

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EXAMINER

MCNALLY, DANIEL

ART UNIT

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1791

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/568,755	<b>Applicant(s)</b> BOEHM ET AL.	
	<b>Examiner</b> DANIEL MCNALLY	<b>Art Unit</b> 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 February 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/21/2006</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to because Figures 6 and 7 do not include a reference numeral “1” for the substrate as disclosed in the specification page 9, line 34 – page 10, line 14; and Figure 11 does not include a reference numeral “7” for the selected bond areas as recited in the specification page 11, lines 18-25. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 19, lines 12-14 recites "incipient melting of selected bond sites by local heating by means of irradiation of the selected bondsites though a focusable heat source of a powder layer". The above portion of the claim is unclear, which appears to be a result of a translation. It is recommended the applicant re-phrase the above step.

Claims 2-18 and 20 depend from the rejected claims, require all of the limitations of the rejected claims and are therefore also rejected for the above reasons.

Claim 5 recites the limitation "the step of immersing" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. It is recommended the applicant change "the step of immersing" to --a step of immersing--.

Claim 7 recites the limitation "the step of electrostatic charging" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. It is recommended the applicant change "the step of electrostatic charging" to --a step of electrostatic charging --.

Claim 8 recites the limitation "the step of immersion" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. It is recommended the applicant change "the step of immersion" to --a step of immersion--.

Claim 9 recites the limitation "the steps of electrostatic charging" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. It is recommended

the applicant change "the steps of electrostatic charging" to --a step of electrostatic charging --.

Claim 10 recites the limitation "the step of electrostatic charging" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. It is recommended the applicant change "the step of electrostatic charging" to --a step of electrostatic charging --.

Claim 12 recites the limitation "the step of contouring" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. It is recommended the applicant change "the step of contouring" to --a step of contouring--.

Claim 14 recites the limitation "the step of preheating" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. It is recommended the applicant change "the step of preheating" to --a step of preheating--.

Claim 15 recites the limitation "the step of afterheating" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim. It is recommended the applicant change "the step of afterheating" to --a step of afterheating--.

Claim 17 recites the limitation "the granules" in line 2. There is insufficient antecedent basis for this limitation in the claim. It is recommended the applicant amend the claim to depend from claim 3 which requires the adhesive to be granules.

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-4, 7, 10, 15, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Derand et al. [US2003/0029742] or Ohman [US6126765] in view Magnin et al. [US2004/0265504] and Soszek [US4710253].

Either one of Derand or Ohman, as recited by the applicant on page 1 of the applicant's specification disclose methods for bonding microstructures using viscous hot melt adhesives. The method comprises applying a hot melt adhesive to one of a substrate or a microcomponent, heating the hot melt adhesive, contacting the substrate and the microcomponent together with the adhesive there between, and allowing a bond to form between the substrate and the microcomponent (Derand paragraphs 0017-0022; Ohman column 1, lines 27-41). Derand and Ohman are silent as to using a pulverulent adhesive and how to apply pulverulent adhesive.

Magnin discloses a method of bonding substrates using a powder adhesive. Magnin discloses the disadvantages of using liquid adhesives when compared to powder adhesives, such as the extra time and energy required to dry the liquid adhesive on the substrates (paragraph 0003). The method comprises providing two substrates to be bonded, providing a powder adhesive, depositing the powder onto one of the substrates, activating the adhesive with heat, contacting the substrates together with the adhesive there between, and curing the adhesive (paragraphs 0013-0023). Magnin discloses the powder is applied to the entire surface or a pattern on the surface, however Magnin is silent as to melting the powder at selected bond sites using a local

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heating means by irradiating the powder at the bond sites with a focusable heat source and removing the powder that is not melted by the focusable heat source.

Soszek discloses a method of applying a powder to a substrate. The method comprises applying a powder material to a surface of the substrate, selectively heating powder in a pattern to bond the heated powder to the substrate, and removing the powder from the surface of the substrate that has not been heated and bonded to the substrate (column 1, line 25 - column 2, line 10). Soszek discloses the heating of the powder can be performed by a focused laser beam which can be moved as desired to form selected bond sites. Although the powder of Soszek is not a powder adhesive, one of ordinary skill in the art would have readily appreciated that Soszek teaches an effective method of handling and applying a powder material, regardless of what type of powder is being used.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the method of either one of Derand or Ohman by using a powder adhesive as taught by Magnin in order to reduce the time and energy required to apply the adhesive to the surface of the substrate to be bonded, and to modify Magnin's method of applying the powder by selectively heating the powder to bond it to the substrate and removing the excess powder as taught by Soszek in order to reduce waste of the powder material by selectively bonding the powder only to the bondsites and reusing the unbonded powder that is removed from the substrate.

With regard to claims 2 and 4, Soszek discloses the heating takes place with a focusing heat source and that the melting takes place with a laser.

With regard to claim 3, Magnin discloses the adhesive is applied as granules.

With regard to claim 7, Magnin and Soszek disclose the powder can be applied by electrostatic deposition, wherein the powder can be charged or the substrate can be charged over the entire surface or to a patterned surface.

With regard to claim 10, Magnin discloses the powder is applied electromagnetically to the whole surface or to a selectively charged surface (paragraph 0047), and Soszek discloses selectively heating the powder to bond the powder to the surface of the substrate.

With regard to claim 15, Soszek discloses heat is applied to the powder to cure the powder material and Magnin discloses the powder between the two substrates is cured to produce bonded substrates, and one of ordinary skill in the art would have readily appreciated applying heat to fully cure the adhesive between the two substrates.

With regard to claims 19 and 20, the above discussion about either one of Derand or Ohman in view of Magnin and Soszek discloses a method of making a microsystem, and therefore also disclose the microsystem formed by the discussed method. Both Derand and Ohman disclose components of the microsystems that are within the range of 1-1000 microns.

6. Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Derand or Ohman, in view of Magnin, Soszek and further in view of Dettling [US3419409].

Either one of Derand or Ohman as modified, disclose a method for bonding microstructures. Applicant is referred to paragraph 5 for a detailed discussion of either



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one of Derand or Ohman as modified. Magnin and Soszek disclose multiple method of applying powder to a substrate, and Magnin discloses it was known preheat the substrate so the powder at least partially cures to the surface upon contact, however the references are silent as to heating the substrate and immersing the heated substrate in the powder adhesive.

Dettling discloses a method of applying a powder coating to a surface of a substrate. Dettling discloses providing the coating material in the form of pulverulent granules in a fluidized bed, heating the surface of the substrate to be coated, and immersing the heated substrate into the fluidized bed to form a coating of the powder material on the surface of the substrate (column 1, lines 20-50).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the method of the references used in paragraph 5 by heating the substrate and immersing the substrate in a fluidized bed of powder material as taught by Dettling in order to form a uniform coating of the powder material on the substrate.

With regard to claim 8, Dettling discloses the powder will coat onto any part of the substrate that is heated to a sufficient temperature. Magnin discloses it is advantageous to coat only a pattern of the substrate in order to reduce the total amount of powder used. One of ordinary skill in the art at the time of invention would have readily appreciated heating a pattern of the surface including any raised or lowered surfaces so that the powder will only coat the patterned surface in order to reduce the total amount of powder material used.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Derand or Ohman, in view of Magnin, Soszek and further in view of Lauchenauer [US3922418].

Either one of Derand or Ohman as modified, disclose a method for bonding microstructures. Applicant is referred to paragraph 5 for a detailed discussion of either one of Derand or Ohman as modified. Magnin and Soszek disclose multiple method of applying powder to a substrate, and Soszek discloses the powder can be applied by screening (column 2, lines 3-10). Soszek is silent as to the screen being able to apply the powder to discrete areas.

Lauchenauer discloses a method of applying a coating of powder material. Lauchenauer teaches the powder can be applied though a screen and that a discontinuous coating of powder can be applied to the substrate using the screen (column 6, lines 34-46).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the method the references used in paragraph 5 by applying the powder in a discontinuous coating using a screen as taught by Lauchenauer in order to reduce the total amount of powder used by only applying powder to the desired areas.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Derand or Ohman, in view of Magnin, Soszek and further in view of Doi et al. [US3662395].

Either one of Derand or Ohman as modified, disclose a method for bonding microstructures. Applicant is referred to paragraph 5 for a detailed discussion of either

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one of Derand or Ohman as modified. Magnin and Soszek disclose multiple method of applying powder to a substrate, and Soszek discloses the powder can be applied by rollering (column 2, lines 3-10). Soszek is silent as to the details of rollering.

Doi discloses a method of applying a powder material to a substrate. The method comprises providing a drum (1) or roller, electro-statically charging the surface of the drum, applying a powdery material to the charged drum, transferring the powder material from the charged drum to the substrate, and heating the powder to bond the powder to the substrate (column 3, line 66 - column 4, line 15).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the method the references used in paragraph 5 by electro-statically charging the roller, transferring the powder to the charged roller, and transferring the powder from the roller to the substrate as taught by Doi in order to form a pattern of powder material on a surface of the substrate without wasting extra powder.

9. Claims 11, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Derand or Ohman, in view of Magnin, Soszek and further in view of Bertelsen [US2947625].

Either one of Derand or Ohman as modified, disclose a method for bonding microstructures. Applicant is referred to paragraph 5 for a detailed discussion of either one of Derand or Ohman as modified. Magnin and Soszek disclose multiple method of applying powder to a substrate. Magnin and Soszek are silent as to using a transfer sheet to coat the powder onto the surface of the substrate.

Bertelsen discloses a method of coating a powder material onto a substrate. The method comprises developing a powder material onto a transfer sheet, positioning the transfer sheet over a substrate to which the powder material is to be transferred, mechanically pressing the powder material from the transfer sheet to the final substrate using a roller and using heat to bond the powder to the substrate (column 2, line 8—column 3, line 49).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the method the references used in paragraph 5 by using a transfer sheet as taught by Bertelsen in order to apply the powder to the desired areas of the substrate without wasting extra powder material.

10. Claims 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Derand or Ohman, in view of Magnin, Soszek and further in view of Karem et al. [US6099679].

Either one of Derand or Ohman as modified, disclose a method for bonding microstructures. Applicant is referred to paragraph 5 for a detailed discussion of either one of Derand or Ohman as modified. Magnin and Soszek disclose multiple method of applying powder to a substrate. The references of paragraph 5 are silent as to preheating the surface to which the adhesive is applied, and after heating by means of a focusable heat source or globally.

Karem discloses a method of powder coating. The method comprises providing a substrate and a pulverulent adhesive, pre-heating the substrate, applying the powder

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adhesive to the substrate, and heating the powder to a temperature to ensure the powder sticks to the substrate (column 2, lines 1-59). Karem discloses the afterheating can take place using a focusable infrared radiation source or a global hot-air source.

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the method the references used in paragraph 5 by preheating the substrate as taught by Karem in order to ensure the powder material sticks to the substrate when the powder is first applied.

11. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Derand or Ohman, in view of Magnin, Soszek in view of Kalbe et al. [US6515048].

Either one of Derand or Ohman as modified, disclose a method for bonding microstructures. Applicant is referred to paragraph 5 for a detailed discussion of either one of Derand or Ohman as modified. The references of paragraph 5 are silent as to the particle size of the adhesive powder.

Kalbe discloses a method of forming a coating of adhesive powder material onto a substrate. Kalbe discloses the adhesive powder material should have a particle size of less than 200 microns and preferably less than 100 microns in order to ensure the adhesive layer is as uniform as possible (column 3, lines 51-57).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the method the references used in paragraph 5 by using particles

that are less than 100 microns in size as taught by Kalbe in order to ensure the adhesive coating is as uniform as possible.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL MCNALLY whose telephone number is (571)272-2685. The examiner can normally be reached on Monday - Friday 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel McNally/

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Examiner, Art Unit 1791

/DPM/

April 14, 2008

/Richard Crispino/

Supervisory Patent Examiner, Art Unit 1791